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**THE ROLE OF METAPHOR IN  
REASONING:**  
A Survey Study in an English as a Foreign Language  
Environment

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# TIIVISTELMÄ

Akseli Haverinen: The Role of Metaphor in Reasoning: A Survey Study in an English as a Foreign Language Environment  
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Metaforien vaikutusta ihmisten ajatteluun, mielipiteisiin ja heidän antamiinsa perusteluihin on tutkittu viime vuosina ja erityisesti käsitteellisiin metaforiin on keskitytty metaforien tutkimuksessa. Tutkimuksissa on huomattu, että se, minkälaisilla kielikuvilla eli metaforilla jostakin ilmiöstä puhutaan, voi vaikuttaa merkittävästi ihmisten käsityksiin ja heidän antamiin perusteluihinsa kyseisestä ilmiöstä. Metaforat eivät esiinny puheissa ja teksteissä pelkästään antamassa väriä, sillä tutkimuksissa on huomattu, että metaforien vaikutus on usein huomaamaton piilovaikutus.

Tämän tutkimuksen tarkoitus oli selvittää englanninkielisten metaforien vaikutusta suomea äidinkielenään puhuviin, ja verrata sitä suomenkielisten metaforien vaikutukseen edelleen suomea äidinkielenään puhuvien keskuudessa. Käytännössä koejärjestelyt pyrkivät selvittämään kuinka paljon toisen kielen, tässä tapauksessa englannin, kompetenssi vaikuttaa metaforien tehoon verrattuna äidinkieliin metaforiin. Aikaisempi tutkimus oli selvittänyt vastaavaa vain koehenkilöiden omalla äidinkielellä. Tutkimusaineisto kerättiin suomalaisten yliopistojen opiskelijoilta neljällä eri verkkokyselyllä, joista kaksi oli suomenkielisiä ja kaksi englanninkielisiä.

Tutkimustuloksista ilmenee, että suomea äidinkielenään puhuville englanninkielisten metaforien vaikutus oli vähäisempää kuin suomenkielisten metaforien vaikutus. Suomenkieliset metaforat tuottivat eroavaisuuksia vastauksissa, minkä lisäksi vastausten perusteluissa ei oltu tunnistettu metaforaa vaikuttavana tekijänä, vaikka se oli ainoa eroavaisuus verkkokyselypareissa. Metaforilla oli siis piilovaikutus. Englanninkielisetkin metaforat tuottivat pienet eroavaisuudet, mutta niiden teho oli vähäisempää. Aihetta tulisi tutkia kuitenkin lisää ennen yleistä ja jatkotutkimuksen tulisi olla laajempi sekä keskittyä selvittämään entistä tarkemmin, kuinka paljon toisen kielen kompetenssi vaikuttaa metaforien ymmärrykseen ja niiden vaikutukseen.

Avainsanat: konseptuaalinen metafora, englanti vieraana kielenä, kyselytutkimus

Tämän julkaisun alkuperäisyys on tarkastettu Turnitin Originality Check –ohjelmalla.

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## 1. Introduction

Metaphors and framing are powerful tools in our language as Lakoff (2004, 3-4) explains with an example about metaphor “tax relief”. In the United States, Republicans had used the phrase “tax relief” as part of their plans. By doing so, they framed themselves as heroes and the opposing party as villains trying to prevent the upcoming “relief”. Soon radio stations, TV stations, newspapers and even Democrats themselves were using the term tax relief, a metaphor which highlighted Republicans as heroes and shooting themselves in the foot, (Lakoff 2004, 4). Lakoff further explains that such frames and metaphors affect people’s reasoning, thus they are an important subject to study further.

Conceptual metaphor theory was first introduced by Lakoff and Johnson in 1980 and the theory has been studied to a greater extent lately as Benczes and Kövecses (2010, vii) note that conceptual metaphor has gained popularity in the last six to ten years and has become the most widely used theory of metaphor. Studies about conceptual metaphor’s effects and framing have been conducted lately, such as the study by Boroditsky and Thibodeau (2011), who state that metaphors and metaphorical frames affect one’s thinking and alter decision making covertly.

The basis of this study is in the mentioned study, “Metaphors We Think With: The Role of Metaphor in Reasoning” by Boroditsky and Thibodeau in 2011. They conducted a study that aimed to demonstrate how metaphors affect one’s decision making with complex real-world issues. The purpose of this research is to partly replicate their study in an English as a foreign language environment and ascertain whether the results will be similar in a different language environment: does competence in a foreign language affect the effectiveness of metaphorical framing? In addition, one part of the research is also translated into Finnish,

which provides an option to compare the results of those Finnish speakers who answered the survey in English to those who answered the Finnish version, which is their native language.

Data collection for this study was implemented by creating four online surveys in online platform “E-Lomake” provided by Tampere University. Online surveys were chosen as the method of data collection for this study as they were used in the previous study by Boroditsky and Thibodeau as well. In addition, online surveys are an easy way to find respondents.

Two of these surveys were English versions from the initial study, and the other two Finnish translations of the first two. The surveys were circulated to students of Finnish universities, by sending them to student organizations’ email lists. Some respondents might have been able to answer multiple surveys if they were on multiple e-mail lists, which is why they were informed that there are other versions of the same study and respondents were asked to answer only one of the surveys, even if they happened to find another later.

This study consists of six Sections. After introduction in Section 1, Section 2 gives an overview of some metaphor theories, analysis of metaphors, metaphors in second language and theory from the previous study. Next, Section 3 shortly revises the previous study and discusses methods and data collection for this study and presents research questions. Section 4 reports the results given by the respondents, while Section 5 discusses these results: what was the outcome of the study and why. Finally, Section 6 provides a conclusion and proposes suggestions for further research.

## 2. Theory

### 2.1. Analysing Metaphors

Knowles and Moon (2006, 9) note that three things must be acknowledged from metaphors in order to analyse them. They explain that traditional approaches to a metaphor name these elements as follows: metaphor is referred to as *vehicle*, its meaning as *topic* and the similarity or connection as *grounds*. They offer a helpful example: “Be prepared for a mountain of paperwork,” in which metaphor or *vehicle* is “mountain”, meaning or *topic* is “a large amount” and connection or *grounds* is “ideas of size, being immovable and difficult to deal with”.

However, Knowles and Moon (2006, 33) explain that “conceptual metaphors equate two concept areas” and use ARGUMENT IS WAR as an example. The concept area from which the metaphor is drawn is called the source domain: here it is WAR. The concept area to which the metaphor is applied is called the target domain: here it is ARGUMENT. Conceptual metaphors are the focus of this study and will be defined further.

### 2.2. Conceptual metaphor theory

Benczes and Kövecses (2010, x in preface) note that George Lakoff and Mark Johnson were first to challenge the traditional metaphor theory in “a coherent and systematic way” with the study *Metaphors We Live By* in 1980. This view has become known as a “cognitive linguistic view of metaphor”. Lakoff and Johnson claimed that:

- (1) metaphor is a property of concepts, and not of words;
- (2) the function of metaphor is to better understand certain concepts, and not just some artistic or esthetic purpose;
- (3) metaphor is often not based on similarity;
- (4) metaphor is used effortlessly in everyday life by ordinary people, not just by special talented

people; and (5) metaphor, far from being a superfluous though pleasing linguistic ornament, is an inevitable process of human thought and reasoning.

Benczes and Kövecses further clarify that metaphor is pervasive in both thought and everyday language, according to Lakoff and Johnson as points (4) and (5) explain.

Knowles and Moon (2006, 31) add that “Lakoff and Johnson’s starting point is that a metaphor is an ordinary part of language, not ‘extraordinary’” and they note that they both see our ordinary conceptual system as fundamentally metaphorical. To demonstrate conceptual metaphors, Knowles and Moon highlight ARGUMENT IS WAR as an example by Lakoff and Johnson. Arguments can be demolished, someone’s claims can be indefensible or be attacked or arguments might be shot down, won, or lost. All these terms could be used with war as well.

Knowles and Moon (2006, 39) explain that Lakoff and Johnson identify different types of conceptual metaphors: structural, orientational and ontological metaphors. In this study, focus will be on structural metaphors. ARGUMENT IS WAR is not only a conceptual metaphor, but also an example of structural metaphor, and Johnson and Lakoff explain that in such cases “one concept is metaphorically structured in terms of another” (Knowles and Moon 2006, 40). They further add that “source domains supply frameworks for target domains: these determine the way in which we think and talk about entities and activities to which the target domains refer.” Here this means that source, war, creates a framework for argument and affects how we behave or act during arguments (Knowles and Moon 2006, 40).

### 2.3. Second language competence and metaphors

Knowles and Moon (2006, 79) note that we are already competent with metaphors when we begin foreign language learning and we are already noticing metaphorical items, even if the

metaphors are conventional. They further ask an interesting question: to which extent conventional English metaphors are also found in other languages. It is important to recognize that an L2 environment can affect the understanding of metaphors, especially if the metaphor is not similarly used in the speaker's native language the same way as it is the second language. However, most second language learners do not achieve the same degree of proficiency as they have in their native language (Behney et al. 2013, 1), which can affect the understanding of metaphors as well.

#### 2.4. Previous study: Metaphors We Think With: The Role of Metaphor in Reasoning

Lera Boroditsky and Paul H. Thibodeau conducted the study that inspired this study: *Metaphors We Think With: The Role of Metaphor in Reasoning* in 2011. They wanted to explore how metaphors influence the way people reason about complex issues. Boroditsky and Thibodeau explain that Gentner and Gentner's earlier study found out that "people's reasoning about electricity flow differed systematically depending on the metaphorical frame used to describe electricity." Critics of such previous studies have argued that there is very little empirical work that identify the influence of metaphor on real-life problem-solving (Boroditsky & Thibodeau 2011). As a result of that, Boroditsky's and Thibodeau's study was designed to highlight how metaphors can shape our reasoning and understanding and they investigated the social policy on crime.

Boroditsky and Thibodeau metaphorically framed crime either as "a wild beast that lurks in the city" or "a virus that infects and spreads in the city". These types of phrases, "crime is a beast" or "crime is a virus", are structural metaphors, in which the source domain of a beast or a virus supplies framework for target domain: crime. As Lakoff and Johnson have argued, structural metaphors could or should change the way people think about target



domains, which is crime here. This means that when Boroditsky and Thibodeau frame crime as a beast, people might think about criminals preying on citizens, police hunting the beasts, or rather criminals, and capturing them. When crime is framed as a virus, people would think about it as a disease that can be cured or even prevented, possibly leading to suggestions about social reforms.

Boroditsky and Thibodeau also mention the importance of narrative structure and mention previous research by J. Bransford and M. Johnson: “Contextual prerequisites for understanding: Some investigations of comprehension and recall”. Based on that study Boroditsky and Thibodeau conducted multiple surveys for their study to reveal where in the text metaphors are most effective.

### 3. Method and materials

This section will discuss methods and materials used in the initial study by Boroditsky and Thibodeau in section 3.1. The initial study is analysed as well because it is the basis of this study. Section 3.2 explains which sections from the initial study are included in this study and why.

#### 3.1. Methods in Metaphors We Think With: The Role of Metaphor in Reasoning

The initial study by Boroditsky and Thibodeau included five different experiments with surveys: Experiments 1-5. These five experiments were conducted to determine where and how metaphors are most effective. Some Experiments had metaphors throughout the text, some had only at the beginning, and one had at the end. In Experiment 3 the metaphors were presented before anything else in the experiment separately.

Each different experiment had two almost identical versions: only metaphors in the given texts about an imaginary city of Addison were different. The texts in each version were followed by open-ended questions or given alternatives to choose from, in which respondents were asked to solve the social problem of crime in the city of Addison.

Before Boroditsky and Thibodeau formed the final structure of their questionnaires, they had conducted a norming survey beforehand. They ended up framing crime either as a beast or a virus. When crime was framed as “a virus infecting the city” or “a wild beast preying on the city”, respondents in the norming survey gave different answers to this issue. General outcome was that those who had read about crime as a beast, suggested capturing it and then either caging or killing it. Furthermore, those who read about crime as a virus wanted to treat it and stop it from spreading by implementing social reforms. Categories for responses were chosen as follows: 1) diagnose/treat/inoculate and 2) capture/enforce/punish.

Boroditsky’s and Thibodeau’s intentions after their norming survey were to investigate and verify this phenomenon. They detected that the metaphor must be in the text to be effective, not before it separately, and that position of the given metaphor affects its effectiveness and the metaphorical frame was indeed effective in three Experiments.

### 3.1.2. Participants in the initial study

Participants in Experiment 1 were from Stanford University and the University of California. The survey was part of their course requirements, which resulted in Boroditsky and Thibodeau receiving 485 responses for Experiment 1. Experiments 2-5 were conducted only in Amazon’s Mechanical Turk, which is a crowdsourcing marketplace, a website in which anyone can augment their data collection, for example. This website allowed researchers to filter out

respondents with lower performance records, resulting in high quality participants. The number of participants in the Experiments 2-5 were 347, 312, 185, and 190, respectively.

### 3.2. Methods and materials in this study

The purpose of this study is to partly replicate the initial study by Boroditsky and Thibodeau in an English as a foreign language environment in Finland. The respondents of the original study spoke English as their native language, while respondents in this study have Finnish as their native language. The purpose of this study is to examine whether the results are similar in different language environments and compare the results: does the lower proficiency in English language affect the results and is metaphorical framing as effective with non-native speakers as it is with native ones?

Additionally, this study adds an extra element with a Finnish section. The purpose of the Finnish section is to investigate whether the covert effect of metaphors is universal. Benczes and Kövecses (2010, 195) investigated this issue by comparing conceptual English metaphors with conceptual metaphors of other languages that were not related to English. This study aims to verify or disprove if conceptual English metaphors in English have an effect in Finland with native Finnish speaker and compare the results to same conceptual metaphor in Finnish.

As this study involves an experiment in Finnish, it does not include every experiment from the initial study. The Experiment chosen in this research is a modified version of Experiments 1 and 2: the text about the city of Addison is from Experiment 1 and questions are from Experiment 2. The text from Experiment 1, which is used in this study, is as follows:

Crime is a {wild beast preying on/virus infecting} the city of Addison. The crime rate in the once peaceful city has steadily increased over the past three years. In fact, these days it

seems that crime is {lurking in/plaguing} every neighborhood. In 2004, 46,177 crimes were reported compared to more than 55,000 reported in 2007. The rise in violent crime is particularly alarming. In 2004, there were 330 murders in the city, in 2007, there were over 500. (Boroditsky and Thibodeau, 2011)

This text from Experiment 1 was chosen because it had two instances of metaphorical framing and it was very descriptive in nature, which produced differences in the results between the respondents who had read crime as a beast and those who had read crime as a virus.

The questions given to respondents after reading the text in this study are from Experiment 2:

- 1) In your opinion what does Addison need to do to reduce crime?
- 2) What is the role of a police officer in Addison?
- 3) Please copy the part of the report that was most influential and paste it in the text area below.

Question 2) “What is the role of a police officer in Addison?” was not included in the first Experiment, but it was added to Experiment 2. This was included to clarify answers by some respondents, since some of them had suggested increasing police force in the city. This type of an answer is ambiguous and could not be categorized properly since it is not obvious what the respondent thinks about police’s role: was it a suggestion to increase enforcement and catch criminals or was it a suggestion to increase police officers to work as role models and educators, for example.

There are some questions about respondents’ background at the end of the survey. The questions are about gender, native language, age, and the length of English studies in

school, but all the information is anonym: age, for example, is given in brackets such as “20-25 years old” for instance.

Surveys in this study are named Survey A, Survey B, Survey C and Survey D. Surveys A and B are replicates from the initial study with the text field and questions mentioned above. Surveys C and D are in Finnish, translated from surveys A and B.

### 3.2.1. Participants in this study

Data collection for this study was implemented online as Tampere University provides an *e-lomake* (‘e-form’) platform, which is a browser-based application. It can be used to create and publish surveys online and the collected data can easily be transferred into statistics, which made the platform perfect for this study.

There were some criteria for the respondents: this study was meant for native Finns, and the question about native language at the end made it easy to filter non-natives out from the results. The other criteria for respondents was the length of English studies in school. If one had studied English only 0-4 years, which was the shortest amount of time in the given brackets, the respondent would be left out due to relative lack of proficiency in English.

One survey was given to participants in a course at Tampere University, and all surveys sent to board members or head of communications of different student organizations in Finnish universities. Only one survey was sent per organization to avoid multiple responses from one respondent. Then, board members would send the survey to their organization’s email list and were advised not to share the original study in their message. These organizations were from Tampere, Jyväskylä, Helsinki, Turku, Vaasa, and Lapland Universities. Thus, most respondents were students or members of university staff, who were on the email lists of these organizations. The surveys were open-access, so respondents could not be moderated the same

way they could be moderated in Amazon Mechanical Turk's tools, but the background questions about age and the length of English studies still allowed some control over respondents, along with the fact that surveys were circulated mostly or only to students of Finnish universities.

### 3.2.2. Research questions

The research questions in this study are as follows:

- 1] Do English as a foreign language speakers get the same results as native speakers did in the initial survey, or does lower proficiency in English language affect the effectiveness of metaphors, and if it does, how?
- 2] Are there differences between the results of English surveys A and B in comparison to the results from translated Finnish surveys C and D?

The hypothesis is that the surveys will most likely yield similar results to the original study, in which metaphorical framing had an effect, and crime metaphors are rather universal. Proficiency in a foreign language might affect understanding metaphors (Behney et al. 2013, 1), but still metaphors should produce differences and it will be interesting to examine how big of a difference there is between foreign and native language metaphors.

## 4. Results

### 4.1 Coding

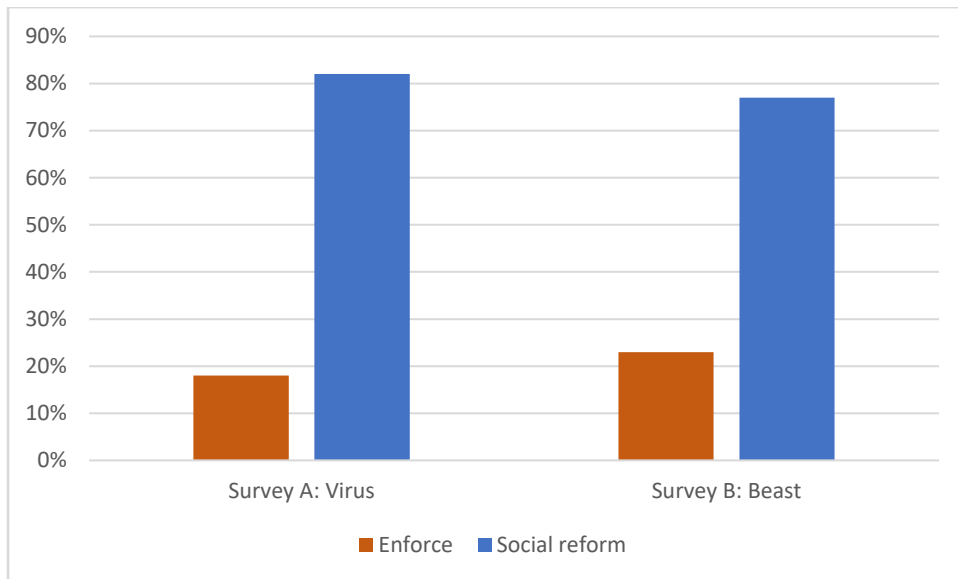
The categorization of the results will be identical to the initial study: proposed solutions will be coded into two categories, giving 1.0 point to the corresponding category. First category is “1) diagnose/treat/inoculate” or and a response is categorized there if it suggests “looking for

the root cause” or if they suggested social reforms such as “fixing the economy” or “helping people in need”. The second category is “2) capture/enforce/punish, and a response is categorized there if the respondent suggested harsher penalties, capturing and hunting criminals, for example (Boroditsky and Thibodeau, 2011). If a response suggested both 1) and 2), it would give 0.5 points to both categories.

The total number of respondents was 155 from all surveys. Survey A received 49 responses, Survey B 39, Survey C 25, and Survey D 42. In total, 27 responses, eight from A, five from B, five from C and nine from D were categorized as “No category” and omitted from the analysis, since they could not be categorized either as enforcing or as social reforms due to lack of information. Omitted answers were often short, such as “I don’t know” or they neutrally suggested “increasing the number of police” without explaining or indicating anything about police’s role as criminal hunters or as role models, for example. In addition to categorial omissions, six responses, three from A and three from B, were omitted because the respondent’s native language was not Finnish.

#### 4.2 Surveys in English: A and B

Overall, respondents suggested social reform more than enforcement as a strategy to solve the crime issue: 82% in Survey A, where crime was framed as a virus, and 77% in Survey B, where crime was framed as a beast. Only 18% in A and 23% in B suggested enforcement as a solution. It was expected that in Survey B, where crime was framed as a beast, respondents would suggest enforcement more. However, the enforcement percentage was only 5% higher in the beast-frame than in the virus-frame.



**Figure 1.** Proportions of proposed solutions to crime by metaphor frame: Surveys A and B

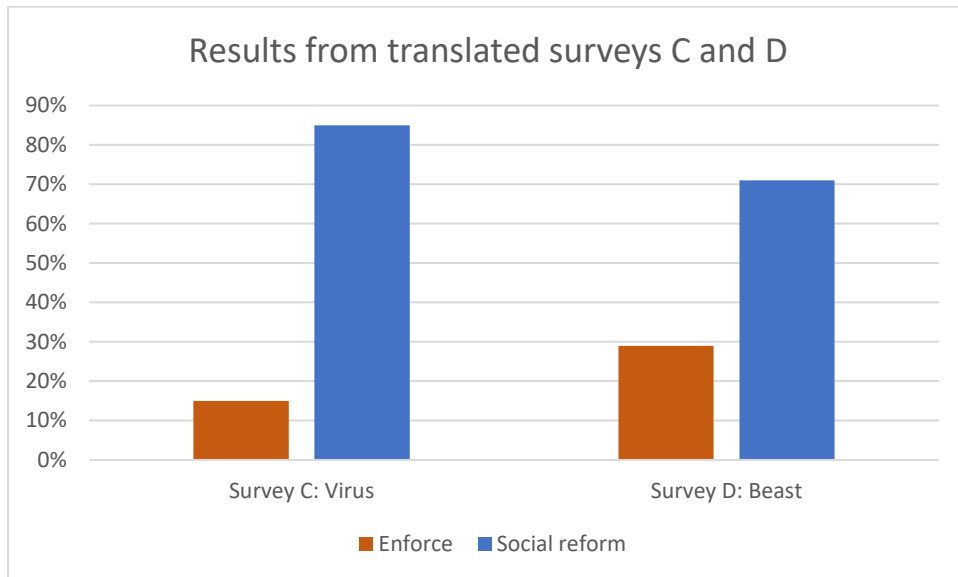
In Survey A, 13 participants named the metaphor as the most influential part of the text, and 11 of those participants suggested social reform rather than enforcement. Enforcement was suggested by two out of 13 respondents who recognized the metaphor, which is similar percentage of enforcement when accounting all responses in Survey A. Similarly, in Survey B only eight participants stated that metaphor was the most influential part of the text. However, only one out of eight, 12,5%, suggested enforcement even after recognizing the beast-metaphor as an important part of the text. Most respondents named crime rates or numerical statistics as the most influential part of the text.

#### 4.3 Surveys in Finnish: C and D

In the translated surveys C and D, respondents were again more likely to suggest social reform as a strategy against the crime. However, this time there was a notable difference between crime as a virus and crime as a beast framing. In Survey C, where crime was framed as a virus, as much as 85% suggested social reform and 15% suggested enforcement. In contrast, when crime was framed as beast in Finnish in Survey D, 71% suggested social reform and



correspondingly 29% suggested enforcement. This results in a 14 percentage point difference between virus and beast frames in translated surveys with translated texts.



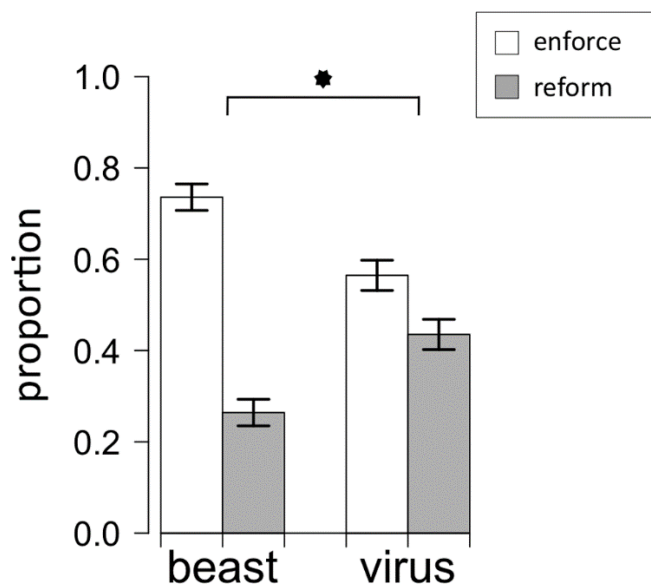
**Figure 2.** Proportions of proposed solutions to crime by metaphor frame: Surveys C and D

The metaphor was recognized as the most influential part of the text by 4 respondents in Survey C where crime was framed as a virus. These respondents who recognized the metaphor resulted in 3.5 points towards social reform category. In Survey D, 5 respondents recognized the metaphor and three out of five suggested enforcement and catching this beast rather than social reform. Overall, in Survey D more people used terminology about capturing the beast or criminals even if they had not recognized the metaphor. Most respondents still named crime rates and numerical statistics as the most influential parts of the text.

## 5. Discussion of the results

The purpose of this study was to ascertain whether metaphorical framing in English affects one's decision making in English as a foreign language environment in Finland with Surveys A and B. In this section, these results will be analysed on their own and then compared to the results of the initial study. Additionally, Finnish Surveys C and D in respondents' native language form a good baseline for the effectiveness of the metaphors with the Finnish audience.

First, Figure 3 shows that the results in the initial study were opposite to this study, but the proportions were the same. Figure 3 is from Boroditsky's and Thibodeau's Experiment 1, which, similarly to this study, had college students as respondents. Most respondents in the United States suggested enforcement as the solution to the crime issue, and smaller proportion suggested social reform in both beast and virus frames.



**Figure 3.** Proportion of proposed solutions to crime by metaphor frame (Boroditsky and Thibodeau, 2011).

In contrast in this study in Finland, most college students or personnel suggested social reform rather than enforcement in virus and beast framings. This applied to both foreign language Surveys A and B and Finnish surveys C and D. Despite the differences, these results

reveal the effectiveness of metaphors in foreign versus native language, and some social differences between United States and Finland. First, since enforcement and social reform response rates were similar, but opposite in these two studies in two different countries, it indicates how people generally think about crime, criminals or police in Finland and the United States, and these differences seem to be social rather than anything else: how crime is generally perceived seems to vary.

The question is then how effective foreign language metaphors were in comparison to native language metaphors? Since social reform was suggested generally more, the smaller differences between enforcement rates must be focused. Results seem to indicate a minor difference between foreign language metaphors. In virus metaphor frame in English in Survey, 18% of the respondents suggested enforcement, whereas in beast metaphor frame in Survey B 23% suggested enforcement. This increase is minor one, but still towards the expected direction since the beast metaphor was supposed to promote catching criminals and enforcement.

However, in Survey C where crime was framed as a virus in Finnish, only 14% suggested enforcement, whereas in the Finnish beast metaphor in Survey D, there was a major increase: 29% suggested enforcement and many responses mentioned hunting this beast or criminals more often: metaphors in one's native language seem to be more effective.

In addition to these results, it is worth noting that 19% of all the respondents named metaphor as the most influential part of the text, which is significantly higher number than in the initial study. There are no clear indications why there is such a difference. However, as many as 81% did still not recognize metaphors and justified their reasoning with either increased crime rates or numerical statistics about crimes. The influence of metaphorical framing in this study was still mostly covert as was in the initial study as well.

All things considered, the covert effect of metaphors is universal but competence in foreign language does reduce metaphors' effectiveness. More Finnish respondents shifted away from the general Finnish consensus of social reform towards enforcement, when reading crime as a beast in Finnish, rather than in English.

## 6. Conclusion

As the study by Boroditsky and Thibodeau (2011), along with the results of this study have shown, conceptual metaphors are a covert tool which can alter one's decision making. The purpose of this study was to partly replicate the study by Boroditsky and Thibodeau "Metaphors We Think With: The Role of Metaphor in Reasoning" in Finland and examine the effect of metaphorical framing in English as a foreign language environment among Finnish respondents. The results indicate that competence in the non-native language does affect the influence of the metaphorical framing, as can be seen from the second part of this study where metaphorical frames had a substantial effect when the metaphors were presented in Finnish to native Finns, in contrast to the lesser effect of English metaphors that were presented to a Finnish audience.

The total number of respondents was 155. However, this number was split among four surveys resulting in 49 respondents in A, 39 in B, 25 in C, and 42 in D respectively, and a larger-scale study should be conducted in the future to confirm the results of this smaller-scale study. Despite not having as many respondents as the initial study, the results did reveal that comprehension in the native language versus comprehension in a foreign language does affect one's reasoning and that native language frames had a stronger effect on the respondents. The percentage of respondents who suggested enforcement roughly doubled from Finnish virus's

14% to beast's 29%. In the English versions respective enforcement numbers were 18% in virus and 23% in beast frame, which is only a minor difference.

To further develop studies such as this in a Finnish environment, more background testing and surveys could be carried out. For instance, some other area than crime could yield more differences in Finland, and Finns indeed seem to conceptualize crime very differently from Americans, since most respondents in this study suggested reform in all cases. The crime was chosen for the initial study since it is such a huge cost to their society in the United States (Boroditsky and Thibodeau, 2011). It was used in this study as well since crime is universal even if it is perceived differently in different countries. The initial study also involved a 28-participant research design to confirm that the authors' structure for the study was sufficient. Such additions and background work could be done to improve a potential follow-up study, which might be carried out in the future in Finland, or some other country in an English as a foreign language environment. As this and previous research has revealed, when people think they are making well-informed decisions, they might actually be influenced by metaphors, which changes how we conceptualize complex ideas, and for this reason it is an area that should be studied in the future as well.

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## Appendix

### Surveys A and B

## Survey A/B: Crime in the City of Addison

This survey collects data for Bachelor's thesis which is part of BA degree studies in Faculty of Information Technology and Communication in Tampere University.

The survey has four versions: A, B, C and D. Please only answer one of them even if you could access them all.

Answering the survey takes about 5 minutes. Thank you in advance for your contribution!

If you have any questions, please contact me: akseli.haverinen@tuni.fi

### Please read the following report about the city of Addison

Crime is **{a virus infecting/a wild beast preying on}** the city of Addison. The crime rate in the once peaceful city has steadily increased over the past three years. In fact, these days it seems that crime **{is plaguing/ is lurking in}** every neighborhood. In 2004, 46,177 crimes were reported compared to more than 55,000 reported in 2007. The rise in violent crime is particularly alarming. In 2004, there were 330 murders in the city, in 2007, there were over 500.

### Survey A/B: Question 1

In your opinion what does Addison need to do to reduce crime?

### Survey A/B: Question 2

What is the role of police officers in Addison?

### Survey A/B: Question 3

Please copy the part of the report that was most influential and paste it in the text area.

**Survey A/B: Background information**

Gender

--Valitse tästä--



Native language

--Valitse tästä--



Age

☐

16-19

☐

20-25

☐

26-30

☐

30-40

☐

40-50

☐

+50

How long have you studied English in school?

☐

0-4 years

☐

5-7 years

☐

8-10 years

☐

+10 years



Surveys C and D, which are surveys A and B translated into Finnish

## Kysely C/D: Rikollisuus Addisonin kaupungissa

Tämä kysely kerää dataa kandidaatintutkielmaan informaatioteknologian ja viestinnän tiedekunnassa Tampereen Yliopistossa.

Kyselystä on neljä eri versiosta: A, B, C ja D. Vastaathan vain yhteen näistä vaikka sinulla olisi pääsy kaikkiin.

Vastaamiseen menee enintään 5 minuuttia. Kiitos osallistumisestasi!

Mikäli sinulla on kysyttävää, voit olla yhteydessä: akseli.haverinen@tuni.fi

### Lue alla oleva raportti Addisonin kaupungista

Rikollisuus on **{virus, joka on sairastuttanut Addisonin kaupungin/villi peto, joka saalistaa Addisonin kaupungissa}**. Viimeisen kolmen vuoden ajan rikollisuuden määrä on kasvanut tasaisesti tässä ennen niin rauhallisessa kaupungissa. Itse asiassa rikollisuus **{on tarttunut melkein jokaiseen kaupunginosaan/rikollisuus vaanii melkein jokaisessa kaupunginosassa}**. Vuonna 2004 kaupungissa tilastoitiin 46 177 rikosta, verrattuna vuoteen 2007 jolloin rikoksia oli jo yli 55 000. Erityisen hälyttävää on väkivaltaisten rikosten määrän nousu. Murhia vuoden 2004 aikana tehtiin 330, kun taas vuonna 2007 niitä tehtiin yli 500.

### Kysely C/D: Kysymys 1

Mitä Addisonin kaupungin tulisi tehdä, jotta rikosten määrää saadaan vähennettyä?

### Kysely C/D: Kysymys 2

Mikä on poliisien rooli Addisonissa?

### Kysely C/D: Kysymys 3

Kopioi ja liitä tai kirjoita raportin merkityksellisin kohta tekstikenttään.

Sukupuoli

Äidinkieli

Age

☐

16-19

☐

20-25

☐

26-30

☐

30-40

☐

40-50

☐

+50